

The Four Season Observer



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What's in this Issue?

- *Note to our readers - pg 1*
- *Comings and Goings - pg 1*
- *Steve Considine Comes in Out of the Cold - pg 2*
- *Review of the 2001 Severe Weather Season - pgs 2-5*
- *Is Your Community StormReady? - pg 5*
- *Verifying Severe Weather: Storm Data - pg 5-6*

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***Note to our readers:** The February 2002 edition will be the last spotter newsletter. More than half the time spent on the newsletter is done so on the production side. Anticipated allocation of staff resources will not allow timely completion of the newsletters. So, the final newsletter will be the February 2002 due out around the 20th. Now, we recognize that the newsletter plays an important role in providing a link between the spotter community and the NWS. We will maintain that link. One of the shortcomings of the newsletter has been its limited production schedule. With only two editions per year, much of the news appearing in the letter is old and dated. Additionally, given limited space available in the letter, some worthwhile articles must be omitted. So, how do we provide you with timely, useful information, while at the same time making it much easier to produce? The answer is the web. In Spring 2002, after the publication of the newsletter, we will begin a web-based "Current News" section on the White Lake Skywarn spotter page (<http://www.crh.noaa.gov/dtx/skywarn.htm>). This page will be updated with useful information frequently throughout the year. We believe this page will provide spotters with a more timely and effective communication tool than the newsletter. As always, we will welcome your comments. Thank you for your understanding. – The Editors.*

Comings and Goings...

Darin Figskey Shufflin' Off to Buffalo. Our much loved Warning Coordination Meteorologist, Darin Figskey has been promoted to Meteorologist-in-Charge at the National Weather Service office in Buffalo, NY. Darin served six years here at White Lake, most recently as the Warning Coordination Meteorologist. Prior to White Lake, Darin rode the plains of West Texas in Lubbock where he served as a forecaster. Darin entered the Weather Service right here in Southeast Michigan at the then Flint office. We wish Darin well in his new post effective October 9, 2001. By the way, if you want to check out some of the fellas Darin will be supervising at Buffalo, here's the web site:

Steve Considine Comes in Out of the Cold. Steve Considine joined our staff this summer as a journeyman meteorologist from the Gaylord, Michigan NWS office. Here, in his own words is a little background on Steve. I was born and raised in southeast Michigan, spending most of my childhood in Flushing, just outside of Flint. My interest in meteorology began very early as a child when I found a great deal of fascination and curiosity with thunderstorms and snow storms. Upon graduation from Flushing High School in 1992, I went on to Central Michigan University in Mt. Pleasant to major in meteorology. I received my Bachelor of Science degree from CMU in 1996. Then I went on to continue to learn more about meteorology at Saint Louis University in St. Louis, Missouri, where, in 1998, I received my Masters of Science degree. In December of 1998, I began my career in the National Weather Service as a meteorological intern at the forecast office in Gaylord, Michigan. In August 2000, I was promoted to a general forecaster at the Gaylord office. This past summer, I decided to transfer to the White Lake office to be closer to family and friends.

Review of the 2001 Severe Weather Season

Ray O'Keefe, Assistant WCM

Severe weather in 2001 began early and lingered late. The first event of the season began on April 7th with a severe hail report from Luna Pier, Monroe County. A turn of the calendar page to September did little to abate the severe weather threat. In fact, the three-day period from September 7th to the 9th was the most active consecutive day period of the season, producing 29 severe events. To date 31 severe weather days have been recorded, yielding 130 severe weather events. Here's a review of the more significant severe weather events of the 2001 season.

April 9: The first major outbreak of the season got underway early. Just before midnight, strong thunderstorms fired in Indiana, just south of the Michigan border. Hail of one inch was reported at Goshen. About 3 am, thunderstorms developed over Hillsdale and into Lenawee Counties. The White Lake office received a report from a HAM operator near Moscow in Hillsdale

County of pea-sized hail and estimated winds of 30 to 40 mph. With radar based severe weather parameters on the rise, a Severe Thunderstorm warning was issued for Lenawee County. The storms remained marginal until about 845 am when a Severe Thunderstorm Warning was issued for Genesee County. Hail was the primary threat as the surface front remained to our south. The combination of instability and shear produced thunderstorms exhibiting strong mid level circulations which in turn allowed stronger and longer-lived updrafts. Remnants of a thunderstorm complex over Chicago tracked into the southern quarter of Southeast Michigan and erupted. Eight more warnings were needed for these storms with the largest hail reported in Lenawee, Washtenaw and Wayne counties. The storms finally moved east into Ontario shortly after noon. On the day, 12 severe events – all hail – were recorded. The largest hail, two inches in diameter was observed in Belleville, Wayne County at 1050 am. Severe reports were tabulated in Genesee, Monroe, Lenawee, Washtenaw, Oakland, Macomb, and Wayne Counties.

April 23: One of a series of strong low pressure systems scooted from the Central Plains into the northern Great Lakes, pushing a strong cold front across the Lakes. Moisture return ahead of the cold front was somewhat limited, with dew points only around 60F. Cooler air moved in aloft during the afternoon, and storms ignited along the leading edge of this cool pool. With 50 knots only a couple thousand feet above the surface, the damaging wind threat was of greatest concern. The Storm Prediction Center issued a severe thunderstorm watch for all of our region, not long before the first warnings from our office. The potent storms took the form of line segments, both straight and bowed. A well defined bow echo transited from Lansing into the thumb, producing sporadic wind damage, and some near-severe observations (48 knots at Bad Axe). The second significant storm was a straight line event that formed in Lenawee/Washtenaw Counties, and caused sporadic wind damage from Ann Arbor into the northern Detroit suburbs, including window damage and trees/fences down at the Montgomery estate in Waterford. One isolated cell moved from Isabella to Gladwin counties. The core missed Midland, but the

severe wind did not. Ten severe events were recorded with Midland, Shiawassee, Saginaw, Genesee, Tuscola, Oakland, Washtenaw, Wayne, and Macomb all recording severe wind events. Measured wind gusts exceeded 60 mph at Flint-Bishop and Willow Run Airports, and Redford, Wayne County.

May 21: The day of the Twister in Lower Michigan! Late morning data analysis pointed to a round of afternoon multicellular storms. Computer models run on the evening of the 20th and early on the morning of the 21st indicated sufficient shear, and instability to support multicellular storms. Unfortunately, the storm mode forecast was not accurate. The late morning computer runs indicated the potential for tornadoes with thunderstorms relatively shallow. End result: a mini-supercell outbreak with isolated tornadoes move across the region. By early afternoon, a surface warm front had moved north into the M-59 tier of counties. Isolated cells developed south of the front in the Ann Arbor area, moving due north. These storms showed persistent rotation in the 5000-15000 feet layer, and produced pea sized hail in South Lyon. They encountered the warm front soon after, and spun up a tornado in Milford. The rest of the day's tornadoes were generated in a similar manner - as the storms crossed the surface warm front. Eastern Livingston County, along US-23 north of M-59, was hardest hit. Late in the event, cell training along a north/south axis produced relatively minor, mainly urban flooding. In total, four tornadoes struck the region, including an F2 in Livingston/Genesee Counties, and F0s in Oakland, Genesee/Lapeer, and Shiawassee Counties. In addition, severe thunderstorm wind gusts were reported in Midland County.

June 15: Abundant sunshine pushed afternoon temperatures to 90 degrees. The high temperatures along with high humidity produced significant instability across Southeast Michigan. In contrast to the large instability, shear on this day was minimal. The high instability and low shear produced thunderstorms of the multicellular variety. Seven severe events were recorded this day. All of were of the severe wind variety with Livingston, Washtenaw, Genesee, Tuscola, Oakland, Wayne, and Lenawee Counties all affected.

July 4: Main severe concern for this holiday was trough crossing Southeast Lower Michigan during the late morning through mid afternoon. But first, morning (830-930 am) convection that quickly fired in St. Clair County had to be monitored. This convection approached, but did not reach, severe limits. As this early convection pulled into Ontario, skies began to clear across northern half of the region, but low stratus/cirrus remained in place across southern half until clearing set in between noon and 2 pm. Ingredients were coming together to place the region in line for a bout of severe weather. Morning data indicated moderate to high instability in place for the afternoon; a potent mid level wind field; and freezing level supportive of hail production. Still some uncertainty lingered. Dry air rapidly approaching Southeast Lower Michigan had the potential to snuff out the convection. First signs of development appeared in late morning as cumulus clouds began forming between Arenac and Kalamazoo along the trough. The first thunderstorms in our area were noted in Sanilac County around 1 pm. Thunderstorms continued to develop right along the trough until 4 pm, after which convergence weakened and dry air intrusion cut off further convective development. By the time the fireworks were going off during the evening, skies had cleared, but not before eight severe weather events were tallied. A combination of severe wind events and severe hail (largest reported hail was one inch in diameter) were recorded. The severe events were spread wide throughout the region with Bay, Saginaw, Livingston, Lapeer, St. Clair, Oakland, Macomb, and Wayne Counties all seeing some severe weather.

July 29: A round of severe thunderstorms occurred during the late afternoon and evening hours. The storms were bolstered by a relatively strong upper level disturbance and a shot of dry air in the mid levels. The associated surface low, lake breeze, and differential heating boundaries were also available as low level focusing mechanisms. The morning White Lake balloon launch added some uncertainty to the situation as it showed a well defined cap around 15000 feet. As it turned out, the short wave had no problem eroding this cap and turning loose some good instability. By 4 pm, a few weak cells formed along the Lake Erie lake breeze around the Detroit area, and a few cells formed along

the Lake Michigan shoreline from about Big Rapids down to Grand Rapids. The storms around Big Rapids slowly organized into a cluster of severe thunderstorms as they moved toward Mount Pleasant and then developed into a bow echo pattern as the system propagated SSE along the instability axis in central lower Michigan. Damaging wind was the primary severe weather threat, but a few cells were able to produce golf ball sized hail. Thirteen severe weather events were totaled. Reports were just about equally divided between wind and hail. The largest hail report was 1.75 inches in Washtenaw County. Other counties experiencing severe weather included Shiawassee, Livingston, Oakland, Lenawee, Monroe, and Wayne.

August 5 - 9: Hot temperatures took hold on Southeast Lower Michigan. High temperatures topping out in the upper 90s (98 at Flint and 99 at Detroit Metro both on the 8th) along with high humidities combined to produce heat indices approaching 115. One death was attributed to the heat. Although neither Flint nor Metro made it to 100, several readings in the upper 90s were recorded. Unfortunately, one death was directly attributed to the heat.

August 19: An upper level low and associated cold pool aloft moved across the forecast area this day. Wind fields were fairly weak and instability modest at best. These ingredients produced pulse-type thunderstorms. Here was another case where severe events were equally distributed between wind and hail. The largest hail reached 1 inch in Oakland County. Other counties reporting severe weather included Bay, Genesee, Lapeer, and Huron. Unlike the previous four counties, Huron County did not record a wind or hail severe event, but rather a tornado. A waterspout came on shore near Harbor Beach, yielding the season's sixth tornado. This tornado was categorized as an F0.

September 7: Usually by September, severe weather is a thing of the past here in Southeast Lower Michigan. But this year was different. September 7th began a string of three consecutive evenings that saw severe weather across the region. According to veteran observers, this stretch of severe weather during September is unprecedented. In fact, a string of three consecutive days of severe weather is rare even in July. On this day,

afternoon temperatures near 90 combined with dew points in the upper 60s to lower 70s to produce plentiful instability. Although mid level winds were respectable around 35 knots, the atmospheric shear profiles were rather unimpressive. A broken line of storms developed near Lake Michigan by late afternoon where weak lake breeze convergence and an upper level disturbance provided some lift. This activity developed into a multicell cluster that reached severe limits in the area from Flint north during the evening. There were a couple of dime hail reports but the majority of the warnings verified on wind damage. A second cluster of storms moved toward the south sections of our area but weakened as they entered Washtenaw and Lenawee counties. Radar trends showed outflow racing well ahead of the northern storms by about 9 pm and led to a weakening trend there as well. Eight severe weather events occurred across Southeast Lower Michigan on this day, with Midland, Bay, Shiawassee, Saginaw, Tuscola, and Wayne counties all experiencing severe weather. Severe hail was marginal, with just dime-size reported.

September 8: An upper level system brushed the northwest part of Southeast Lower Michigan between 2 pm and 8 pm. In addition, satellite data indicated that dry air moved across the region enhancing the potential for severe winds. Instability was impressive for early September. The wind profile in combination with the dry air suggested the main severe threat would be winds. And indeed when all severe reports were tallied, severe wind was the culprit in all 13 severe events. Numerous reports of trees blow down were received. Severe weather was reported in Shiawassee, Lenawee, Genesee, Monroe, Wayne, Macomb, Oakland, Lapeer, St. Clair, Washtenaw, and Sanilac Counties.

September 9: Southeast winds well ahead of an approaching cold front spun up a supercell in Sanilac county during the early afternoon. Radar signatures indicated the potential for a tornado, prompting the issuance of a tornado warning. At the time, instability was not sufficient to drive the tornado to the surface over land. The storm continued to intensify over Lake Huron where a waterspout was reported 1/4 mile from shore. Much of Southeast Michigan was blanketed by

extensive cloud cover during the afternoon. However, across Monroe County, sunshine and very high humidity combined to produce extreme instability. In this environment, a supercell developed producing dime size hail. Later in the afternoon as the cold front moved closer to Lower Michigan, computer projections suggested that the atmosphere was conducive to the development of tornadoes, prompting the issuance of a Tornado Watch. Additional thunderstorms developed ahead of the front over southwest Michigan, resulting in a report of a tornado near Lansing. As the storms moved into Southeast Michigan, they weakened where extensive cloud cover and nightfall led to diminishing instability. White Lake NWS Doppler radar indicated winds to 50 knots just off the surface. In this environment, a couple of thunderstorm wind gusts knocked down some wires, trees and tree limbs. Eight severe events occurred with this system with Sanilac, Monroe, St. Clair, Midland, Washtenaw, Macomb, Livingston, and Genesee Counties all witnessing some severe weather. A 76 mph wind gust was recorded at Mount Clemens.

In summary, 130 severe weather events were recorded in Southeast Lower Michigan, including six tornadoes, this season. This contrasts with 180 events in 2000, including one tornado.

Is Your Community *StormReady*?

Ray O'Keefe, Assistant WCM

StormReady was designed by the National Weather Service to provide citizens the skills and education needed to survive severe weather. *StormReady* arms America's communities with the communication and safety skills necessary to save lives and property. The NWS White Lake office works with communities here in Southeast Lower Michigan to complete an application and review process. So far, Washtenaw and Monroe Counties, and the cities of Dearborn Heights and Sterling Heights have joined over 200 other locales across the Nation as *StormReady* communities.

To be recognized as “*StormReady*”, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe

weather warnings and forecasts and to alert the public

- Create a system that monitors local weather conditions
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

For more information on *StormReady*, see the following National Weather Service web site:

<http://205.156.54.206/stormready/>

Verifying Severe Weather: *Storm Data*

Steve Considine, Storm Data Focal Point

As a spotter, you may wonder what becomes of the reports you give us during severe weather. This may come as a surprise to many of you, but the National Weather Service does not dispose of your reports once the severe weather threat has ended. All spotter reports are used to compile a publication called *Storm Data*. The *Storm Data* publication is a historical database for severe weather across the country. Included in this database are statistics on severe thunderstorms, tornadoes, hurricanes, flooding, droughts, excessive heat and cold spells, winter storms and any other meteorological phenomenon which may pose a threat to life and property. Statistics for these events include their timing and location, type of damage, loss of life or injuries, and estimated economic impacts. A brief description of how the event unfolded is also included. As a complete record of severe weather across the country, *Storm Data* is used heavily by historians, insurance agencies, and other individuals who may have needs for the data.

Here at the National Weather Service in White Lake, spotter reports are gathered at the end of each month and entered into the *Storm Data* database. In addition to your reports, information from law enforcement, broadcast and print media, and emergency management are gathered and entered into the database. The database is then sent to Washington DC for inclusion in the *Storm Data* publication. From these

data, the National Weather Service is able to calculate how well warnings are being issued and how much lead time we are giving the public before the storm hits. This sets a measure of how much improvement we need to make in the issuance of our warnings. Thus, not only are your spotter reports used in real time to issue warnings and relay to the public the eminent threat of severe weather, they are being used to keep a record of severe weather affecting southeast Michigan and setting the standard for how well we at the National Weather Service can continue to improve our services.